

PATENT

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APPLICATION FOR PATENT

ON

MARINE AND POOL CLEANER

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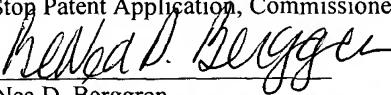
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MARINE AND POOL CLEANER

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority under 35 U.S.C. §119(e) to the United States Provisional Application Serial No. 60/401,648, filed on August 6, 2002, which is herein incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention generally relates to the field of power tools, and particularly to a marine and pool cleaner which provides cleaning of surfaces that are subjected to aquatic environments.

BACKGROUND OF THE INVENTION

[0003] From swimming pools to the boats and ships that fill the waterways of the world, there is a wide variety of recreational and work activities that take place in water. Consequently, there is a need to keep devices and structures used in the water or used to hold water, clean.

[0004] Currently, for many non-commercial applications the cleaning of surfaces located in or providing aquatic environments is done by hand. For example, the owner of a pool is often forced to spend significant time cleaning, by hand, the surfaces in the pool. This work can be exhausting due to such factors as pool size and/or build-up of heavy film from oils and airborne debris. Another example may include the owner of a water vehicle who performs maintenance by hand, removing build up from the hull and other surfaces. Tools provided are typically focused to commercial cleaning service providers and are not affordable to or easily used by the individual.

[0005] Therefore, it would be desirable to provide a product that can be used by an individual to clean surfaces subjected to aquatic environments and other instruments located in such environments.

SUMMARY OF THE INVENTION

[0006] Accordingly, the present invention is directed to a marine and pool cleaner that may be used to clean a variety of surfaces that may be subjected to various aquatic environments. In an aspect of the present invention, a marine and pool cleaner for cleaning a surface is provided including a hand held cleaning head assembly for engaging the surface and directing water onto a work area on the surface. Coupled with the cleaning head assembly is a drive assembly for providing a driving force to the cleaning head assembly. A transmission assembly is coupled with the cleaning head and the drive assembly, the transmission assembly for transmitting the driving force of the drive assembly to the cleaning head assembly. A water attachment assembly provides the water from a water source to the cleaning head assembly. The marine and pool cleaner uses the cleaning head assembly and water to clean the surface.

[0007] In another aspect of the present invention, a marine and pool cleaner for cleaning a surface is provided comprising a hand held cleaning head assembly including a handle coupled with a right angle cleaning head, the hand held cleaning head assembly for engaging the surface and directing water onto a work area on the surface. An electric motor assembly is coupled with the hand held cleaning head assembly, the electric motor assembly provides a driving force to the cleaning head assembly via a flex drive cable. A water attachment assembly provides water from a water source to the cleaning head assembly. Further, the marine and pool cleaner comprises a transport assembly coupled with the electric motor assembly, the transport assembly provides portability to the marine and pool cleaner. The marine and pool cleaner uses the cleaning head assembly and water to clean the surface.

[0008] It is to be understood that both the forgoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention as claimed. The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention and together with the general description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The numerous advantages of the present invention may be better understood by those skilled in the art by reference to the accompanying figures in which:

FIG. 1 is an isometric illustration of a marine and pool cleaner including an electric drive assembly in accordance with an exemplary embodiment of the present invention;

FIG. 2 is an isometric illustration of a marine and pool cleaner including a pneumatic drive assembly in accordance with an exemplary embodiment of the present invention;

FIG. 3 is an isometric illustration of a marine and pool cleaner including a generator assembly in accordance with an exemplary embodiment of the present invention;

FIG. 4 is an isometric illustration of a marine and pool cleaner including a storage assembly;

FIG. 5 is an isometric illustration of a first exemplary embodiment of a cleaning head assembly including a water valve coupling assembly for use with the marine and pool cleaner of FIG. 1;

FIG. 6 is an isometric illustration of a second exemplary embodiment of a pneumatic cleaning head assembly including a water valve coupling assembly for use with the marine and pool cleaner of FIG. 2;

FIG. 7A is an isometric illustration of a third exemplary embodiment of a cleaning head assembly including an electric motor assembly and a water valve coupling assembly for use with the marine and pool cleaner of FIG. 3;

FIG. 7B is a perspective view of the cleaning head assembly including an outlet port for directing water onto a surface;

FIG. 8 is a perspective view of an operator using the marine and pool cleaner of FIG. 1 to perform cleaning operations on a pool surface; and

FIG. 9 is a perspective view of an operator using the marine and pool cleaner of FIG. 2 to perform cleaning operations on a recreational water vehicle.

DETAILED DESCRIPTION OF THE INVENTION

[0010] Reference will now be made in detail to the presently preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. The marine and pool cleaner is advantageously suited for the individual user who needs a tool to clean surfaces which are subjected to aquatic environments, such as swimming pool surfaces and water vehicle surfaces. The marine and pool cleaner is capable of cleaning off heavy films (suntan oils, etc...) from pool surfaces and a variety of debris or organic build up on water vehicles in marine environments. It is further contemplated that the marine and pool cleaner of the present invention may be employed for cleaning a variety of other surfaces. For example, cleaning tile in school/university locker rooms, hotels, businesses, and the like. Further, the present invention may be employed for cleaning of various stone surfaces, such as those found on public buildings, monuments, grave stones, and the like. The marine and pool cleaner may reduce operator fatigue, provide reduced noise output, is easily transportable, employs a transmission assembly that allows the user to operate the cleaning head upon a surface remote to a drive assembly, and enables completion of cleaning faster than a manual process.

[0011] Referring generally now to FIGS. 1 through 9, exemplary embodiments of the present invention are shown. The marine and pool cleaner 100, shown in FIG. 1, includes a frame 101, a hand held cleaning head assembly 102, a drive assembly 104, a transmission assembly 106, and a water attachment assembly 108. The frame 101 is coupled with a cross support member 132 and a first platform 103 upon which the drive

assembly 104 is disposed. Further, the frame is disposed with a storage assembly 124 comprising a chest 126 and a second platform 128. The frame 101 is also coupled with the cross support member 132 to reinforce structural integrity. It is further contemplated that the cross support member 132 may be a bar, cross-beam, or the like. The cross support member 132 and the first and second platforms may be coupled with the frame 101 using a variety of fastening devices, such as screws, bolts, pins, and the like. Additionally, the frame 101 is coupled with a first support member 113 and a second support member 115. In the preferred embodiment, these two support members are welded to the frame 101 and provide bracing for the marine and pool cleaner when not engaged by an operator. It is understood that the first and second support members may be coupled with the frame using a variety of fastening devices as described above with respect to the cross support member 132 and the first and second platform 103 and 128.

[0012] In the preferred embodiment, the frame 101 has a generally S-shaped profile and provides a handle 119. Proximal to the bottom of the “S” is where the drive assembly 104 is located. Additionally, a transport assembly 121 is located near the bottom of the “S”. The transport assembly 121, in the preferred embodiment, comprises a first wheel assembly 123 and a second wheel assembly 125. The first and second wheel assembly 123 and 125 are located on opposite sides of the “S” from one another and on the farthest corners from the handle 119. On the two other bottom corners of the frame 101, the first support member 113 and second support member 115 restrain the wheel assemblies from moving by on the ground. The first and second support member 113 and 115 may be rectangular shaped or may be two pegs that extend to the ground. In this embodiment, the first and second support member 113 and 115 are disengaged by simply lifting the handle 119, which liberates the first and second wheel assembly 123 and 125. On the other hand, in another embodiment, both wheel assemblies may be positioned on the corners closest to the handle 119, which would allow the first and second support member 113 and 115 to be disengaged by pushing down on the handle 119. This embodiment would facilitate the user in lifting the handle 119 because the wheel

assemblies would act as a fulcrum. In an alternative embodiment of the present invention, it is further contemplated that the frame 101 may be box shaped and may be disposed with four wheels on each bottom corner, which would make the frame 101 more convenient to transport. In this embodiment, the wheels may be equipped with a braking assembly that, when engaged, allows the frame 101 to remain stationary. The box shaped frame 101 may also be equipped with only two wheels and two support members without departing from the scope and spirit of the present embodiment. It is still further contemplated that, in another alternative embodiment, the frame 101 may take on a triangular shaped profile. In this embodiment, the frame 101 may be equipped with two wheels and two support members or four wheels equipped with a braking assembly.

[0013] The hand held cleaning head assembly 102 comprises a cleaning head 110 coupled with a handle 112. As shown in FIG. 1, the handle 112 includes a drive port 114. The water attachment assembly 108 comprises a water valve coupling assembly 116 coupled with the cleaning head 110 and handle 112. The water valve coupling assembly 116 provides a main fluid channel connected to an outlet port 111 on the cleaning head 110. The water flows through the main fluid passage of the water valve coupling assembly 116 and out the cleaning head 110 via the outlet port 111. The water valve coupling assembly 116 further includes a selector assembly 117 which allows the operator of the marine and pool cleaner to regulate the flow of water. Further, the water attachment assembly includes a fluid transfer device 118 (i.e., a hose) which may couple with the water valve coupling assembly 116 on one end and a water source (e.g., spigot) on the other end.

[0014] It is contemplated that the fluid transfer device may be a standard garden hose or other fluid transfer device provided by the user of the marine and pool cleaner. Thus, the water valve coupling assembly 116 may include a standard size attachment ring or be sized to meet specific requirements. It is understood that the water coming through the outlet port 111 may flow onto the surface directly under the rotating cleaning head 110.

Alternatively, the outlet port 111 may be located in various positions upon the hand held cleaning head assembly 102. Additionally, it is contemplated that the water attachment assembly 108 may couple the hand held cleaning head assembly 102 with various other hydraulic and/or gaseous compounds. For example, a detergent or other cleaning compound may be provided through the hose 118 of the water attachment assembly 108. Further, the water attachment assembly 108 may include multiple water valve coupling assemblies coupled with the cleaning head 110 and the handle 112 in order to provide various compounds. For instance, the hand held cleaning head assembly 102 may be coupled with multiple hoses with one hose providing water from a water source and the second hose providing a detergent.

[0015] The drive port 114 couples with the transmission assembly 106. The transmission assembly 106 comprises a flex drive cable 120 which couples on one end with the drive assembly 104 and the drive port 114 on the other end. The flex drive cable 120 transmits the drive force produced by the drive assembly through the drive port 114 to the cleaning head 110. The drive force creates a rotating cleaning head 110 for scrubbing a surface. Alternatively, the cleaning head 110 may be enabled as an orbital rotating cleaning head or other movement capabilities which promote effective cleaning of a surface as may be contemplated by one of ordinary skill in the art. The size and type of the cleaning head 110 may be varied in order to accommodate different user needs. For example, a marine and pool cleaner being used to clean surfaces in a pool may have very different requirements from a marine and pool cleaner being used to clean the hull of a water vehicle.

[0016] The flex drive cable 120 may be of various lengths. For example, the flex drive cable 120 may range in length from two feet to one hundred and fifty feet. Preferably, the flex drive cable 120 is seventy-five feet in length. The flex drive cable 120 may include one or more strain relievers to assist in preventing acute angles of bending from developing in the flex drive cable 120 during operation. The number and location of the

strain relievers may vary as contemplated by one of ordinary skill in the art. Further, the type of strain relievers employed may vary without departing from the scope and spirit of the present invention.

[0017] In the present embodiment, the marine and pool cleaner further includes a hanger 107 coupled with the frame 101. The hanger 107 is used to store the fluid transfer device 118 and the flex drive cable 120 when not in use. The location, size, and configuration of the hanger 107 may vary as contemplated by one of ordinary skill in the art. It is contemplated that the transmission assembly 106 may enable a variety of functionalities. For example, the transmission assembly 106 may include the flex drive cable 120 and the fluid transfer device 118 bundled into a single unit. This may increase ease of use of the marine and pool cleaner and provide for easier storage capabilities of the marine and pool cleaner. Further, the transmission assembly 106 may include multiple fluid transfer devices 118. It is understood that the length of the fluid transfer device 118 and the flex drive cable 120 may vary relative to one another. In an alternative embodiment, it is further contemplated that the hanger 107 may comprise a torsion spring-loaded spool assembly that allows the flex drive cable 120 and fluid transfer device 118 to be retracted and stored in a safe, clean, and time efficient manner. It is also contemplated that the spool may be equipped with a button or switch that, when depressed, retracts the flex drive cable 120 and fluid transfer device 118. In yet another alternative embodiment, it is further contemplated that the hanger 107 may be equipped with a manual winding assembly, consisting of a handle coupled with a spool. In this embodiment, the user can rotate the spool by turning the handle. This rotation would wrap the flex drive cable 120 and fluid transfer device 118 around the hanger 107, thus retracting said cable and device in a safe, clean, and time efficient manner.

[0018] As may be seen in FIGS. 1 through 9, the cleaning head 110 is set at a right angle to the handle 112. In the current embodiment, the cleaning head has a four inch diameter. Alternately, the size of the cleaning head may vary as contemplated by one of ordinary

skill in the art. This positioning of the cleaning head 110 provides for the effective use of the marine and pool cleaner against numerous surfaces. However, the angle of the cleaning head 110 relative to the handle 112 may be adjusted or reconfigured as contemplated by one of ordinary skill in the art in order to promote increased cleaning effectiveness. Additionally, the hand held cleaning head assembly 102 may further include an adjustment assembly allowing the operator of the marine and pool cleaner to manually adjust the angle of presentation of the cleaning head 110 relative to the handle 112. Also coupled with the hand held cleaning assembly 102 is a splash guard 129. The splash guard 129 is located proximally to the cleaning head 110 and provides the user of the marine and pool cleaner 100 with a guard against any splashing from the cleaning head 110. The splash guard 129 is preferably of a size extending beyond the diameter of the cleaning head 110, but not significantly interfering with operation of the marine and pool cleaner 100. The splash guard 129 may form a full circle around the cleaning head 110 or a partial circle around the cleaning head 110. It is understood that the location, size, and configuration of the splash guard 129 may vary without departing from the scope and spirit of the present invention.

[0019] The drive assembly 104 comprises a motor assembly with an on/off switch 105. In the preferred embodiment, the on/off switch is a standard toggle switch coupled to the top of the drive assembly 104. It is also contemplated that the on/off switch may be a depression switch assembly, two-position switch, and the like. It is further contemplated that the on/off switch may be coupled to the handle 119 which would allow for convenient operation of the drive assembly. The drive assembly 104 is coupled with the frame 101 by being situated upon a platform 103. The platform 103 is connected to the frame 101 through use of a plurality of fastening devices, such as screws, bolts, pins, and the like. It is contemplated that the drive assembly 104 may be coupled with the frame by use of fastening devices, similar to those mentioned previously without the use of the platform 103. The drive assembly 104 provides a driving force to the cleaning head assembly 102. In the preferred embodiment of FIG. 1, the motor assembly is an electric

motor assembly. The electric motor assembly drives the flex drive cable 120 which in turn couples with drive port 114, providing angular momentum to the cleaning head 110. Power is provided to the electric motor assembly through a power cord 122 which may connect with a standard electrical outlet. It is contemplated that the electric motor assembly may receive power from a variety of sources, such as batteries, fuel cells, rechargeable batteries, and the like.

[0020] The power output capabilities of the drive assembly 104 may be varied as contemplated by one of ordinary skill in the art. For example, the marine and pool cleaner used for pool cleaning applications may use an electric motor which produces a lower range of power output while the marine and pool cleaner used for marine cleaning application may use an electric motor which produces a higher range of power output. The power output capabilities of the drive assembly 104 may play a large factor in the determination of the size of the cleaning head 110 employed with the hand held cleaning head assembly 102 as previously discussed. For instance, a higher power output electric motor assembly may be able to use or require a larger cleaning head 110 than a lower power output electric motor assembly. In the preferred embodiment, the electric motor is a 1hp (horsepower) electric motor. However, the size and resultant horsepower of the motor may vary as contemplated by one of ordinary skill in the art.

[0021] In an alternative embodiment, the drive assembly 104 may employ a motor assembly using combustion to create power output, such as a gasoline engine. The gasoline engine may couple with the transmission assembly to provide angular momentum to the cleaning head. The gasoline engine may be coupled to the frame directly or mounted upon a platform which is coupled with the frame. It is contemplated that the gasoline engine may provide a range of horsepower to the present invention. For example, the gasoline engine may be a 1hp engine up to a 5hp engine. While the ranges provided describe an optimized working range it is understood that the range of

horsepower which may be provided to the present invention may vary as contemplated by one of ordinary skill in the art.

[0022] In an alternative embodiment, the drive assembly 104 may provide the water to the hand held cleaning assembly 102. For instance, the marine and pool cleaner may further comprise a water storage container for providing a water source. The drive assembly 104 may provide pumping capabilities and by being connected to the water storage container and a fluid transfer device provide water to the hand held cleaning head assembly 102. It is understood that the number, location, and size of the water storage containers employed with the marine and pool cleaner of the present invention may be varied without departing from the scope and spirit of the present invention. In further alternative embodiments, the marine and pool cleaner may include more than one drive assembly 104 which in turn may enable the use of multiple hand held cleaning head assemblies, transmission assemblies, and water attachment assemblies. As discussed above, alternative hydraulic compounds, such as detergents, may be employed within each of the above alternative embodiments of the marine and pool cleaner.

[0023] The storage assembly 124 is included upon the marine and pool cleaner 100 for storage of various accessories. In the present embodiment, the storage assembly 124 is a chest 126 disposed upon the second platform 128 connected to the frame of the marine and pool cleaner. As mentioned previously, the second platform 128 may be connected through use of a variety of fastening devices, such as screws, bolts, pins, clamps, and the like. Accessories may include cleaning heads, gloves, chemicals used for cleaning, and the like. For instance, muriatic acid is sometimes employed to speed the process of cleaning heavy build up on surfaces like a swimming pool. The storage assembly 124 may take a variety of alternative forms including an integrated chest coupled directly to the frame 101. Additionally, the storage assembly 124 may comprise a chest with one or more drawers for storage and access capabilities. The location of the storage assembly 124 may vary to provide more space or more convenient access.

[0024] The transport assembly 121, comprising the first and second wheel assembly 123 and 125, may be configured as a variety of transport enabling devices. For instance, casters, rollers, skids, and the like, may be employed on the frame 101. In alternative embodiments, two or more wheels, casters, rollers, skids, and the like, may be employed to provide transportability. Further, the use of two or more transport enabling devices may provide added stability and reduce or eliminate the number of support members required to maintain the marine and pool cleaner position when not engaged by an operator. The size and location of the transport assembly 121 may be varied to meet the needs of different users without departing from the scope and spirit of the present invention.

[0025] In FIG. 2, a marine and pool cleaner 200 is shown similar in every respect to that shown in FIG. 1, except the drive assembly 204 is a pneumatic assembly which couples a pneumatic hose 206 with a pneumatic hand held cleaning assembly 208. In FIG. 3, a marine and pool cleaner 300 is shown, similar in every respect to that shown in FIG. 1, except that the drive assembly is a generator assembly 304 which couples an electrical cord 308 with a motorized hand held cleaning assembly 310 that comprises an electric motor assembly 312 coupled with a cleaning head 314 and water valve coupling assembly 316. The generator assembly 304 is gas powered and started by pulling a pull cord 328. The pull cord 328 is disposed proximal to the front of the generator assembly 304 so that it is easily accessed by the user. In an alternative embodiment, it is further contemplated that the marine and pool cleaner 300 may be disposed with a power strip 326. In the current embodiment, the power strip 326 integrates with the cross support member 132 and provides the user with a means to employ other electric devices while using the marine and pool cleaner 300. In alternative embodiments, the power strip 326 may be coupled with the cross support member 132 using a variety of fastening devices. Thus, the power strip 326 may be a modular unit capable of being removed from the cross support member 132. For instance, the user could employ the marine and pool

cleaner 300 to power an electric spray painter, nailer, drill assembly, or the like. The power strip 326 accepts electric power from the generator assembly 304 by a standard electric cord. The electric cord is simply coupled at one end to the generator assembly 304 and at the other end to the power strip 326. It is further contemplated that the electric cord may be varied in length so that the user may move the power strip 326 to a remote work area. The hand held cleaning assembly 102, the pneumatic hand held cleaning assembly 208, and the motorized hand held cleaning assembly 310 will be described below.

[0026] Referring generally now to FIGS. 5 through 7, exemplary embodiments of the hand held cleaning assembly 102, the pneumatic hand held cleaning assembly 208, and the motorized hand held cleaning assembly 310, are shown. In FIG. 5 the hand held cleaning assembly 102 is shown including the cleaning head 110 coupled with the handle 112 and a water valve coupling assembly 116. At a first end 130 of the handle 112, a drive port 114 couples the transmission assembly 106 to the hand held cleaning assembly 102. The drive force imparted through the transmission assembly 106 is transmitted to the cleaning head 110 through the handle 112. It is contemplated that the size and configuration of the handle 112 may be varied to accommodate different user needs or transmission assembly configurations. The drive port 114 may also be varied in size, configuration, and location on the handle 112 as may be contemplated by one of ordinary skill in the art.

[0027] In FIG. 6, the pneumatic hand held cleaning head assembly 208 comprising a cleaning head 210 coupled with a handle 212 and a water attachment assembly 214 is shown. The water attachment assembly 214 may be similar in all respects to the water attachment assembly 108, shown and described in FIG. 1. The handle 212 comprises a first end 216 disposed with a drive port 218. The drive port 218 couples the pneumatic hose 206 to the hand held pneumatic cleaning head assembly 208. The pneumatic hose 206 provides for the transfer of pressurized air from the pneumatic motor assembly 204

to the pneumatic hand held cleaning head assembly 208. The handle 212 includes a fluid channel 220 which is coupled at one end to the water attachment assembly 214 and at the other end with the cleaning head 210. The pressurized air provides the driving force to rotate the cleaning head 210 in a similar fashion as that described previously for the cleaning head 110 in FIG. 1.

[0028] In FIG. 7A, the motorized hand held cleaning assembly 310 that comprises an electric motor assembly 312 coupled with a cleaning head 314 and a water attachment assembly 316 is shown. The electric motor assembly comprises an electric motor at least partially encompassed by a housing 318. The housing 318 includes a first end 320 disposed with an adapter 322. The adapter 322 couples the electrical cord 308 with the electric motor. The electric motor is operationally coupled with the cleaning head 314 through a second end 324 of the housing 318. Proximal to the second end 324 of the housing 318 and the cleaning head 314 is coupled the water attachment assembly 316. The water attachment assembly is similar to that shown and described in FIG. 1. In FIG. 7B, the outlet port 111 is shown. The outlet port 111 allows the marine and pool cleaner to clean surfaces more efficiently by applying a constant flow of water directly to the work surface.

[0029] Referring now to FIGS. 8 and 9, marine and pool cleaner 100 and marine and pool cleaner 200 are shown operationally engaged by a user upon a swimming pool surface and a water vehicle surface, respectively. It is understood that marine and pool cleaner 100, 200, or 300 may be engaged upon any or all surfaces requiring the need of cleaning after exposure to an aquatic environment. In FIG. 8, the user 802 employs the marine and pool cleaner 100 in a generally vertical position against a pool surface 804, such as tile. The tile is scrubbed with water by the rotating cleaning head 110. As described previously, the tile may be scrubbed by cleaning head 110 with water and a detergent or other chemical compound, released through the cleaning head 110 by the water attachment assembly 108. The splash guard 129 is in place to deflect any splashing

back towards the user of water and/or detergent or other chemical compounds being released through the cleaning head 110.

[0030] It is believed that the present invention and many of its attendant advantages will be understood by the forgoing description. It is also believed that it will be apparent that various changes may be made in the form, construction and arrangement of the components thereof without departing from the scope and spirit of the invention or without sacrificing all of its material advantages. The form herein before described being merely an explanatory embodiment thereof. It is the intention of the following claims to encompass and include such changes.